

## REMARKS/ARGUMENTS

In the Office Action dated November 6, 2003, Claims 1-35 are pending, of which Claims 1-20 have been elected for prosecution. Claims 3-5 and 15-17 are rejected under 35 U.S.C. § 112, second paragraph as being indefinite. Claims 1-6 and 8-12 are rejected under 35 U.S.C. § 102(b) as being anticipated by each of U.S. Patent No. 5,447,586 to Tam and U.S. Patent No. 5,177,340 to Zaffiro. Claims 2-12 are also rejected under 35 U.S.C. § 103(a) as being unpatentable over Tam or alternatively Zaffiro. Claims 13-20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Tam or alternatively Zaffiro and further in view of U.S. Patent No. 5,886,313 to Krause, et al. and/or U.S. Patent No. 5,705,788 to Beyer, et al.

With respect to the rejection of Claims 3-5 and 15-17 under 35 U.S.C. § 112, second paragraph, Applicant submits that the claims are not indefinite and that there is antecedent basis for the phrase “the constructing step.” In particular, Claims 1 and 13 each recite “providing a feedforward response surface . . . .” Claims 2 and 14, which depend on Claims 1 and 13, respectively recite “wherein providing a feedforward response surface comprises constructing the feedforward data table of data points . . . .” Thus, each of Claims 2 and 14 includes the specified constructing step. Further, the constructing step of each of Claims 2 and 14 is the same constructing step that is referred to in Claims 3-5 and Claims 15-17, respectively. It is noted that the amendments to Claims 2, 5, and 14-17 are made to resolve the informalities identified by the Examiner, and are not otherwise relevant to patentability.

Regarding the rejections made under § 102(b) and § 103(a), Applicant respectfully traverses each of the rejections. In particular, Applicant submits that none of the cited references teaches or describes a method of heating a fiber tape including “determining a feedforward control value based on the target temperature of the fiber tape and the velocity of the fiber tape and according to the feedforward response surface” wherein the feedforward response surface is provided by “providing a feedforward data table of data points, each data point correlating a predefined velocity of the fiber tape, a predefined feedforward control value, and a resulting temperature of the fiber tape, and wherein determining a feedforward control value comprises

retrieving a value from the feedforward data table based upon the target temperature and the velocity of the fiber tape” as set forth in each of Claims 1 and 13 as presently amended.

Tam does not describe “determining a feedforward control value based on the target temperature of the fiber tape and the velocity of the fiber tape and according to the feedforward response surface,” as set forth in Claims 1 and 13. In fact, neither of the first or second loops **80**, **70** described by Tam are used to determine a feedforward control value based on the target temperature and the velocity. In her comments, the Examiner refers to col. 4, lines 27-63, for a description of a feedforward response surface and control value. As set forth in that section, controller **82** of loop **80** calculates the first component of the velocity command using a temperature error and a gas flow measurement. The second component of the velocity command is calculated using a temperature setpoint and the gas flow. The first and second velocity commands are then added to produce a desired velocity command **85**, which is compared to a user set lower limit **86** and a time varying upper limit **87**. See col.4, lines 32 to 63. Neither the first or second components are determined according to the velocity of the tape. The second loop **70** calculates a first component **74** of the gas command using a velocity error (the measured velocity subtracted from the desired velocity). The desired velocity and the temperature setpoint are used to calculate the second component of the gas command. A velocity saturation **86** is used to calculate the third component of the gas command, and the three components of the gas command are added to form the desired gas command **76**. See col. 4, line 64 to col. 5, line 14. Thus, although the gas command may be determined in part according to the temperature setpoint and the velocity, Tam does not describe a feedforward control value that is based on the target temperature and the velocity of the tape according to a feedforward response surface, as claimed. Further, Tam does not describe determining a heat control valve based on such a feedforward control value (based on the target temperature of the tape and the velocity of the tape) and a feedback control value.

Neither Tam nor Zaffiro describes “providing a feedforward response surface,” as set forth in Claims 1 and 13 “wherein providing a feedforward response surface comprises providing a feedforward data table of data points, each data point correlating a predefined velocity of the fiber tape, a predefined feedforward control value, and a resulting temperature of the fiber tape.”

Tam does not describe providing a feedforward data table. Further, as noted above, Tam does not determine a feedforward control value according to the velocity and temperature of the tape. Accordingly, Tam does not describe providing a data table of data points that correlate velocity and temperature with feedforward control values.

Zaffiro describes a feed forward predictive component  $U_{FF}$  of the control word  $U_1$ . See col. 9, lines 16 to 51. However, the feed forward predictive component  $U_{FF}$  is determined according to Equation 4 shown at col. 9, line 22. Equation 4 is based on the useful heat output of the bulbs 42, the heat loss and heat load of the system 14, the heater zone area, and the necessary temperature increase from the unheated tape temperature to the processing temperature. To the extent that errors occur between the desired and actual heated tape temperatures, Zaffiro states that the control word can be adjusted to change the energy level radiated by bulbs from the nominal level directed by the feed forward component, i.e., using a compensation signal  $U_{COMP}$ . Zaffiro does not describe providing a data table for the feed forward predictive component  $U_{FF}$  or any of the components used for calculating the feed forward predictive component  $U_{FF}$ . More particularly, Zaffiro does not describe providing a data table of data points that correlate velocity and temperature with feedforward control values, as recited in Claims 1 and 13.

For the foregoing reasons, Applicant submits that Claims 1 and 13 are not anticipated by either of Tam or Zaffiro. Accordingly, Claims 2-12 and Claims 14-20, which are dependent on Claims 1 and 13, respectively, are also not anticipated by Tam or Zaffiro. Further, Applicant submits that dependent Claims 3-12 and 14-20 provide additional bases for patentability over Tam and Zaffiro and are neither anticipated nor made obvious by Tam or Zaffiro, alone or in combination. For example, Claims 2 and 14 state that determining the feedforward control value includes constructing the feedforward data table and retrieving a value from the feedforward data table. Neither Tam nor Zaffiro describe constructing such a table or retrieving a feedforward control value from the table.

Claims 3-7 and Claims 15-19 recite particular steps for constructing the feedforward data table that are not described by Tam or Zaffiro. For example, Claims 3 and 15 recite operating the machine at the predefined velocity, providing the predefined feedforward control value as a heat control value, measuring the resulting temperature of the tape, and storing the predefined

velocity, feedforward control value, and resulting temperature as a data point. Neither Tam nor Zaffiro describe providing a predefined feedforward control value as a heat control value and storing such values that result during operation of the machine. Similarly, Claims 4 and 16 recite calculating the resulting temperature and storing the predefined velocity, the predefined feedforward control value, and the resulting temperature. No description for storing such values in a feedforward data table is provided by Tam or Zaffiro. Claims 6 and 18 recite that the feedforward control value is mathematically defined according to the feedforward response surface. Claims 7 and 19, which are dependent on Claims 6 and 18, respectively, recite the relationship:

$$FCV(t) = B_0 + B_V * V + B_T * T + B_{VT} * V * T + B_{TT} * T^2$$

The Examiner has asserted that “defining the feedforward value as the claimed equation is well known in the art . . . .” Applicant respectfully disagrees. Applicant finds no such teaching in any of the cited art. In particular, Applicant notes that neither Tam nor Zaffiro describe a nonlinear relationship between a feedforward control value and temperature.

Further, with respect to the rejection of Claims 13-20 under 35 U.S.C. § 103(a) as being unpatentable over Tam or alternatively Zaffiro and further in view of Krause, et al. and/or Beyer, et al., Applicant submits that neither Krause, et al. nor Beyer, et al. describes “providing a feedforward response surface . . . wherein providing a feedforward response surface comprises providing a feedforward data table of data points, each data point correlating a predefined velocity of the fiber tape, a predefined feedforward control value, and a resulting temperature of the fiber tape.” Moreover, Applicant submits that no motivation exists for the combination of Krause, et al. or Beyer, et al. with either Tam or Zaffiro. The Examiner has cited no such motivation, and Applicant finds no motivation in the cited references. Further, it is unclear that the heating operation described by Zaffiro would be compatible with a method using a laser diode array as set forth in Claim 13. For example, as noted above, the feed forward predictive component  $U_{FF}$  is determined according to such values as the useful heat output of the bulbs 42, the heat loss and heat load of the system 14, the heater zone area, and the necessary temperature increase from the unheated tape temperature to the processing temperature. Neither Zaffiro nor

the other cited references describe the calculation of a feedforward control value for a laser diode array.

For the foregoing reasons, Applicant submits that Claims 1-20 are allowable.

\* \* \* \*

### CONCLUSIONS

In view of the remarks presented above, Applicant submits that the present application is in condition for allowance. As such, the issuance of a Notice of Allowance is therefore respectfully requested. In order to expedite the examination of the present application, the Examiner is encouraged to contact Applicant's undersigned attorney in order to resolve any remaining issues.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,

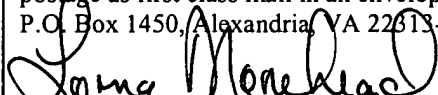


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